# SummitGbX™ Installation and User Guide

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# SummitGbX™ Installation and User Guide

This document describes the features and installation of the Summit™ Gigabit Ethernet Fiber-Optic Extender (GbX).

## SUMMITGbX OVERVIEW

The SummitGbX Gigabit Ethernet Fiber Optic Extender greatly increases the maximum single mode fiber interconnect distance between Gigabit Ethernet switches from the standard IEEE 802.3z distance of 500 meters to 80 km (50 miles), or more. The attenuation characteristics of the installed fiber plant determine the maximum distance that can be achieved. Links beyond 100 km are possible using an optical amplifier option.

The SummitGbX is fully compatible with the Gigabit Ethernet IEEE 802.3z standard for fiber optic interfaces.

Network management and loopback control functions are provided by an RS-232c port. The SummitGbX supports full duplex operation as defined in IEEE 802.3x. This results in 2 Gbps of actual link bandwidth, and provides lower latency, due to simultaneous transmit and receive operations.

Figure 1 shows how the SummitGbX Extender offers network planners an important, and fundamentally different, way to configure Gigabit Ethernet network by giving users interconnect distances up to 100 km. In most cases, the SummitGbX allows much greater freedom in the use of Summit and BlackDiamond™ switches, as distance limitations cease to be a factor.

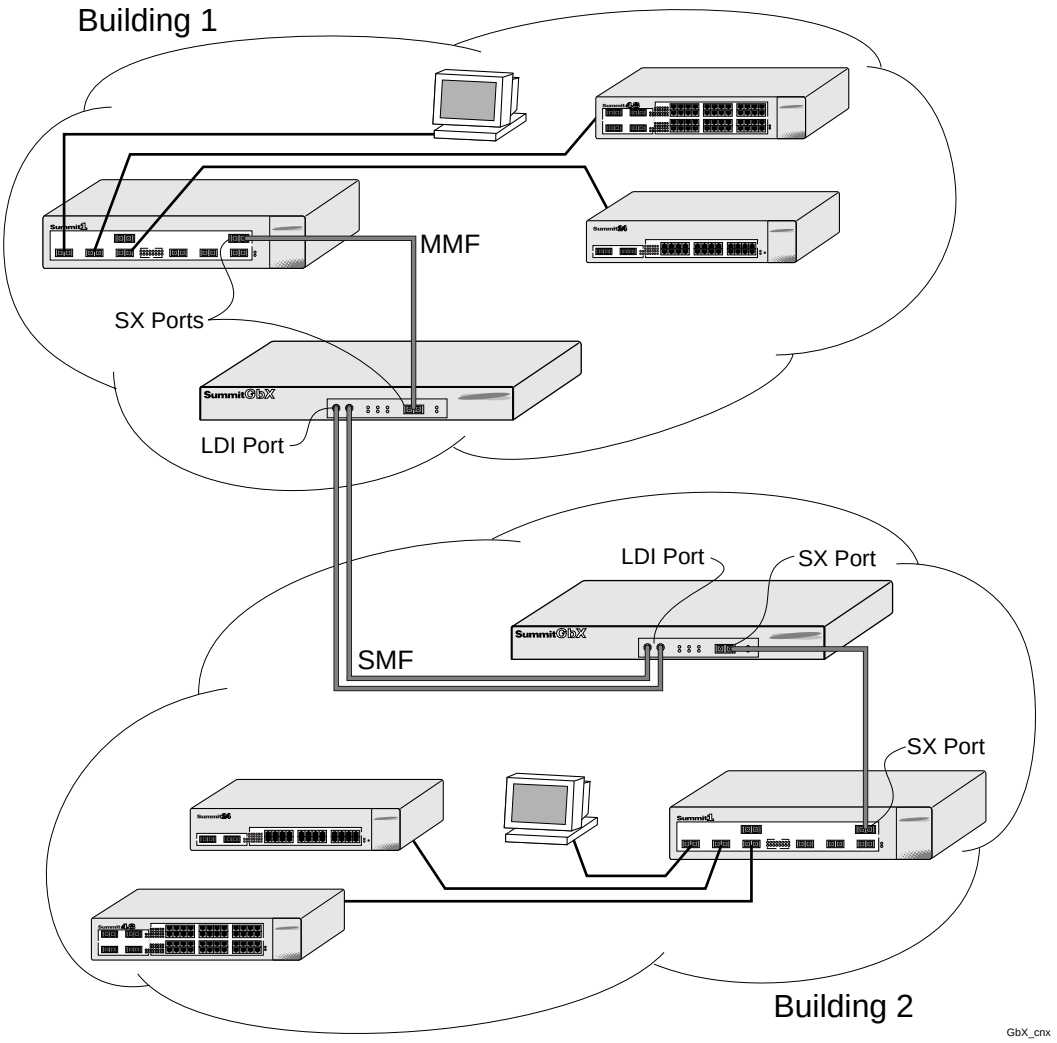


**Figure 1:** SummitGbX used in a typical configuration

# SUMMARY OF FEATURES

The SummitGbX extends the distance of Gigabit Ethernet links on Summit and BlackDiamond switches to 80 kilometers using single mode fiber. Depending on the quality of fiber, distances of 100 kilometers, or more, can be achieved. The summary of features is as follows:

- One full-duplex Gigabit Ethernet fiber optic interface and one full-duplex long-distance fiber interface
- Full-duplex bandwidth operation with 2 Gbps throughput
- Highly reliable performance and a very low Bit Error Rate (BER) of $10^{-12}$
- Standard duplex SC optical connector interface to Summit switches
- Standard SC optical connector for long-distance fiber interface
- Graphical user interface for management, using an RS-232c port
  - — Loopback diagnostic control
  - — Signal
  - — Loss of synchronization
  - — Over-temperature warning
- Low profile, 1U (1.75 inches)
- Standard 19-inch rack mount
- Dual, redundant, load sharing power supplies

# SUMMITGbX FRONT VIEW

Figure 2 shows the front panel view of the SummitGbX.

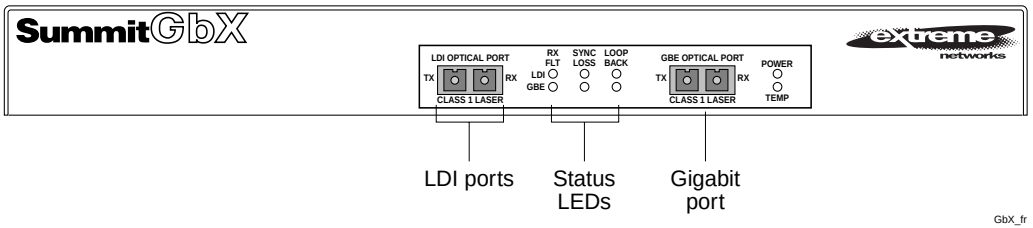


**Figure 2:** SummitGbX front panel

## PORTS

The SummitGbX has one 1000BASE-SX port for connecting the SummitGbX to a Summit or BlackDiamond switch, and one single mode long-distance interface (LDI) for connecting between two SummitGbX units. Each 1000BASE-SX and LDI port has one optical transmitter interface (TX) and one optical receiver interface (RX).

## LEDS

Table 1 describes the LED behavior on the SummitGbX.

**Table 1:** SummitGbX LEDs

| LED | Color | Indicates |
|---|---|---|
| RX FLT (Receive Fault) | Green | Signal received |
| | Yellow | No signal received |
| SYNC LOSS (Synchronization Loss) | Green | Receive clock detected |
| | Yellow | Receive clock not detected |
| LOOP BACK | Green | In normal mode (no loopback) |
| | Yellow | Loopback mode |
| POWER | Green | Power on |
| TEMP | Green | SummitGbX temperature normal |
| | Yellow | SummitGbX indicating an overheat condition |

## MEDIA TYPES AND DISTANCES

Supported media types and distances are described in Table 2.

**Table 2:** Media Types and Distances

| Media Type | Standard | Media | Guaranteed Distance |
|---|---|---|---|
| 850nm Multimode Optics | 1000BASE-SX | 50/125um Multimode Fiber (500/500 MHz–km) | 550 Meters |
| | | 62.5/125um Multimode Fiber (160/500 MHz–km) | 220 Meters |
| | | 62.5/125um Multimode Fiber (200/500 MHz–km) | 275 Meters |

**Table 2:** Media Types and Distances (continued)

| Media Type | Standard | Media | Guaranteed Distance |
|---|---|---|---|
| 1550nm Single mode Optics | | 10u Single mode Fiber | 100 Kilometers |

## LONG DISTANCE INTERFACES

Table 3 describes the Long Distance Interface (LDI) specifications.

**Table 3:** LDI Specifications

| Parameter | Minimum | Typical | Maximum |
|---|---|---|---|
| **LDI Optical Transceiver** | | | |
| Optical Output Power | 0dBm | 1dBm | See Note 1 |
| Optical ExtinctionRatio | 7dB | | |
| Center Wavelength | 1530nm | 1550nm | 1565nm |
| Optical Rise/Fall Time | 0.5ns | | |
| **LDI Optical Receiver** | | | |
| Optical Input Power Sensitivity | | -34dBm | -32dBm |
| Optical Input Power Maximum | | | -8dBm |
| Operating Wavelength | 1200nm | 1550nm | 1600nm |
| Optical Return Loss | 27dB | | |

**Note 1:** The transmitter output power level for the SummitGbX is +1dBm. The maximum allowable receiver input power level is -8dBm. Therefore, there is a minimum of 9dB loss required for the link to operate error-free. This minimum required loss can be achieved using a fiber length of 40 km (0.25 dB/km provides 10dB loss), or by adding 10dB of fixed optical attenuator at the receiver end.

# SUMMITGbX REAR VIEW

Figure 3 shows the rear panel view of the SummitGbX.

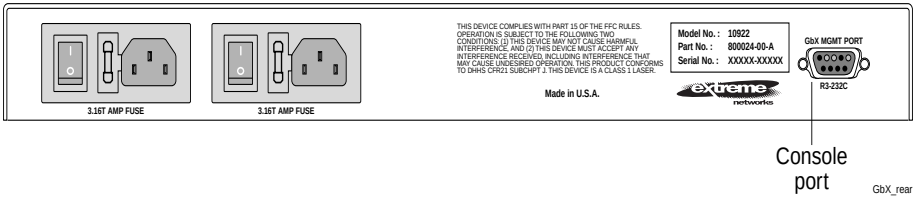


**Figure 3:** SummitGbX rear panel

## POWER SOCKET

The SummitGbX automatically adjusts to the supply voltage. The power supply is autoranging from 100 VAC to 240 VAC.

## MANAGEMENT PORT

The console port (9-pin, D-type connector) is used to connect a terminal for local, out-of-band management.

# INSTALLING AND PREPARING THE SUMMITGbX FOR USE

The SummitGbX can be mounted in a rack, or placed free-standing on a tabletop.

## PREPARING THE SUMMIT GbX FOR USE

*To ensure safe operation of this equipment and personnel using this equipment, the cautions and warnings in this manual must be followed. This equipment has been manufactured and tested according to international safety standards. There are no user-serviceable parts in the SummitGbX.*

### INITIAL INSPECTION

If the shipping container shows signs of damage, keep it, and all packing materials, until the SummitGbX has been thoroughly tested and verified. Verify that all contents are complete, according to the list below:

- SummitGbX in electro-static discharge (ESD) bag
- 19-inch rack mount kit
- Summit GbX Installation and User Guide (this document)
- Power cords (2)
- Software diskette

If any contents are found missing, or if the SummitGbX is found to be damaged, contact Extreme Networks immediately for assistance.

### POWER REQUIREMENTS

The SummitGbX is designed to accept 100 to 240 VAC, 50 to 60 Hz main power. The SummitGbX automatically senses and adjusts for the proper AC voltage level.

*Failure to properly ground the SummitGbX can result in personal injury or equipment damage. Connect the power cord only to a receptacle with a protective safety ground. Do not defeat the earth grounding protection by using an extension cord or other device that defeats the safety ground connection.*

### OPERATING ENVIRONMENT REQUIREMENTS

The SummitGbX is designed to operate in a 10 to 50 degree C ambient environment. Do not restrict the air intake or exhaust vents.

*Obstructing the air intake or exhaust of the SummitGbX may produce internal temperatures leading to device failure. Do not block the intake or exhaust of the unit. Do not operate the unit outside its specified temperature range.*

## RACK MOUNTING

The SummitGbX is 1U (1.75 inches) high and fits in a standard 19-inch rack.

To rack mount the SummitGbX, follow these steps:

**1** Place the SummitGbX on a hard flat surface with the front facing toward you.

**2** Remove the existing screws from the left and right sides of the chassis and keep the screws for Step 4.

**3** Locate one of the mounting brackets over the mounting holes on the left side of the unit.

**4** Insert the four screws and fully tighten, using a suitable screwdriver.

**5** Repeat Steps 3 and 4 for the right side of the SummitGbX.

**6** Insert the SummitGbx into the 19-inch rack and secure the rack mount brackets with suitable screws (not provided). Ensure that ventilation holes are not obstructed.

**7** Connect the cables.

## FREE-STANDING

The SummitGbX is supplied with four self-adhesive rubber feet. Apply the rubber feet to the underside of the device by sticking one at each corner of the switch.

## CONNECTING TO OTHER DEVICES

To install the SummitGbX, follow these steps:

**1** Mount the SummitGbX in the equipment rack, or, if the SummitGbX will be located on a table, place the rubber feet on the bottom of the SummitGbX.

**2** Connect the 1000BASE-SX port on the first SummitGbX to a Gigabit Ethernet port on a Summit or BlackDiamond switch, using a multimode (MMF) cable.

**3** Connect the first SummitGbX to a second SummitGbX, using LDI ports and single mode fiber (SMF) cables with SC simplex connectors.

**4** Connect the 1000BASE-SX port on the second SummitGbX to a Gigabit Ethernet port on a second Summit or BlackDiamond switch, using a multimode fiber (MMF) cable.

## POWERING ON THE SUMMITGbX

To turn on power to the SummitGbX, connect the power cable to the SummitGbX and then to the wall outlet. Turn the On/Off switch to the On position.

## CONNECTING EQUIPMENT TO THE SUMMITGbX CONSOLE PORT

Connection to the console port, located on the rear of the unit, is used for direct local management. The SummitGbX console port settings are set as follows:

- **Baud rate** — 9600
- **Data bits** — 8
- **Stop bit** — 1
- **Parity** — None
- **Flow control** — XON/XOFF

The terminal connected to the console port must be configured as a VT-100 terminal, with the same settings. This procedure is described in the documentation supplied with the terminal.

*Ensure that text wrapping is disabled, and local echo text is enabled on your terminal.*

Appropriate cables are available from your local supplier. To make your own cables, pin-outs for a DB-9 male console connector are described in Table 4.

**Table 4:** Console Connector Pin-Outs

| Function | Pin Number |
|---|---|
| TXD (transmit data) | 3 |
| RXD (receive data) | 2 |
| GND (ground) | 5 |

Figure 4 shows the pin-outs for a 9-pin to 25-pin (RS-232) null-modem cable.

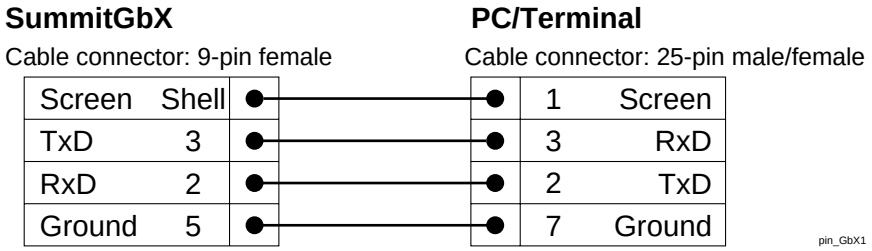


**Figure 4:** Null-modem cable pin-outs

Figure 5 shows the pin-outs for a 9-pin to 9-pin (PC-AT) null-modem serial cable.

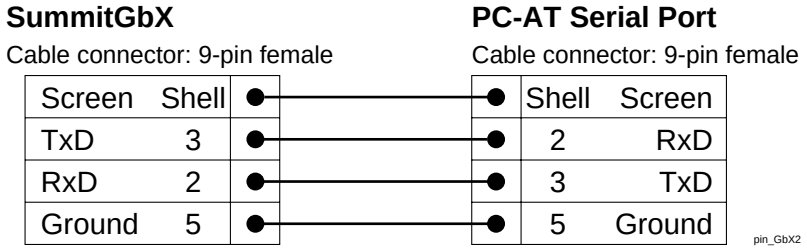


**Figure 5:** PC-AT serial null-modem cable pin-outs

*The null modem cable used for other Summit and BlackDiamond switches is compatible for use with the SummitGbX.*

# MANAGING THE SUMMITGbX

There are two ways to access the SummitGbX for management:

- The GUI installed on a PC.
- A VT100 terminal or a PC running terminal emulation software.

## USING THE GRAPHIC USER INTERFACE

This section describes how to use the GUI to manage the SummitGbX.

### SYSTEM REQUIREMENTS FOR THE GUI

The GUI can be loaded on a PC that meets the following minimum requirements:

- Windows 95 or Windows NT version 4.0
- 64 MB RAM
- 100 MB disk space
- 200 Mhz Pentium CPU
- 1.44 Mb 3.5" floppy drive (if you are using the supplied floppy diskette to load the application)
- A network connection (if you are downloading the application from the Extreme Networks web site: http://www.extremenetworks.com/extreme/support/installgbx.htm )

### INSTALLING THE GUI

To install the GUI on your PC, first copy the file `SummitGbX_GUI.zip` into any folder on the hard disk (for example, a newly created SummitGbX folder.) Either copy the file from the supplied diskette, or download the file from the Extreme Networks web site, and save it to the folder.

Complete the installation following these steps:

- Unzip the contents of `SummitGbX_GUI.zip` into the same folder.
- Double-click `setup.exe`.
- Follow the prompts, filling in appropriate system and directory information.

The MonitorGbX icon is created on the Microsoft Office toolbar. Double-click this icon to launch the GUI application.

### REMOVING THE GUI

To uninstall the GUI, use `Add/Remove Programs` from the control panel. Then, manually delete any remaining files from the folder.

### USING THE GUI

To launch the GUI application, double-click the MonitorGbX icon from the Office toolbar. The GbX Monitor window appears, as shown in Figure 6.

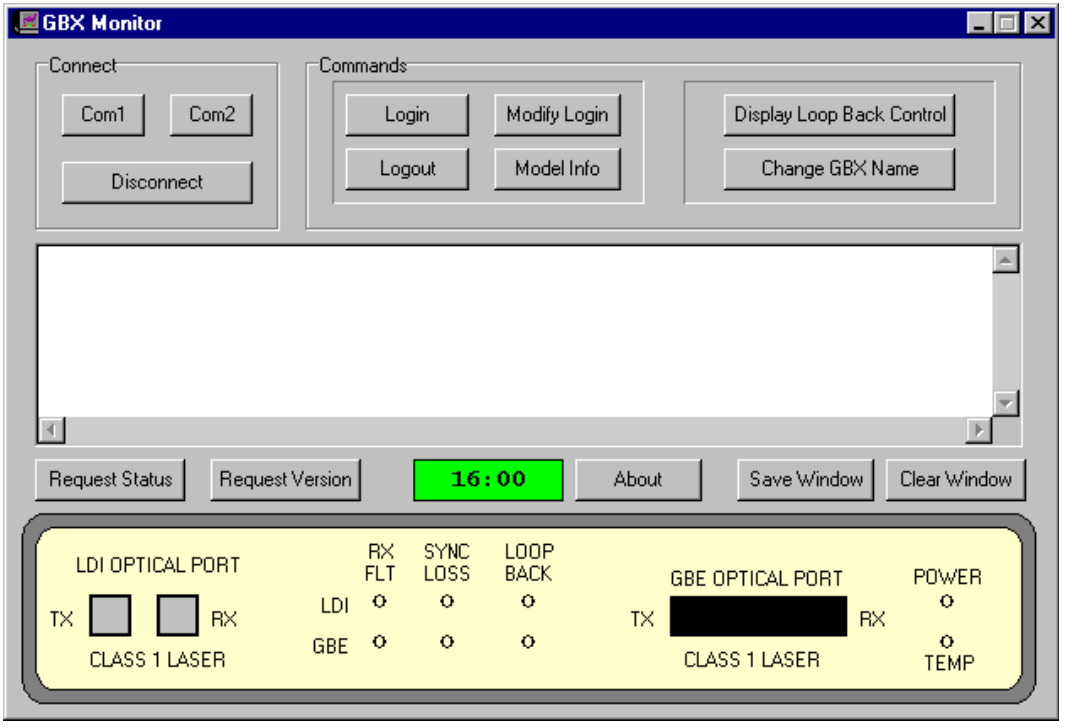


**Figure 6:** GbX Monitor window

The GbX Monitor buttons are described in Table 5.

**Table 5:** GbX Monitor Buttons and Functions

| Button | Description |
|---|---|
| Com1 | Connect GbX Monitor on Com1 to SummitGbX. |
| Com2 | Connect GbX Monitor on Com2 to SummitGbX. |
| Disconnect | Disconnect GbX Monitor. |
| Login | Log in to SummitGbX. |
| Logout | Log out of SummitGbX. |
| Modify Login | Modify login name and password (maximum 15 characters). |

**Table 5:** GbX Monitor Buttons and Functions (continued)

| Button | Description |
|---|---|
| Model Info | Display SummitGbX model information. |
| Display Loop Back Control | Enable/disable loop back control, including LDI loop back and GBE loop back. |
| Change GbX Name | Modify SummitGbX name (maximum 11 characters). |
| Request Status | Display status information. |
| Request Version | Display version information. |
| About | Display Extreme Networks information. |
| Save Window | Save configuration changes |
| Clear Window | Clear window. |

By default, the login user name is `admin`, and the default password is `admin`. The login name and password are case sensitive.

*When enabling the loopback mode on any interface, disable the Gigabit Ethernet ports on all connected Summit switches.*

## USING TERMINAL EMULATION

This section describes how you can manage the SummitGbX using the command line interface (CLI) via a VT100 terminal, or a PC running terminal emulation software. Communication to and from the SummitGbX is by ASCII text, using the printable ASCII character set.

The following characters are permitted:

```
!"#$%&'()*+-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ
[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

A blank space is also allowed, and all user entries must be terminated with the `[Enter]` key.

### COMMANDS

Table 6 describes the CLI commands.

**Table 6:** CLI Commands

| Command | Description |
|---|---|
| **Configuration/Status Mode Commands** | |
| `CMD GLE` | Enable Gigabit Ethernet loopback. |
| `CMD GLD` | Disable Gigabit Ethernet loopback. |
| `CMD LLE` | Enable long distance loopback. |
| `CMD LLD` | Disable long distance loopback. |
| `CMD RS?` | Request status. |
| `CMD V?` | Request software version. |
| `CMD ID` *xxxxxxxxxxx* | Set unit identification (maximum 11 Characters) |
| `CMD I?` | Display the factory model and serial numbers. |
| **Password Mode Commands** | |
| `CMD USR` *xxxxxx* | Enter login name. |
| `CMD PAS` *xxxxxx* | Enter password. |
| `CMD CUSR` *xxxxxx* | Change login name (maximum 15 characters) |
| `CMD CPAS` *xxxxxx* | Change password (maximum 15 characters). |
| `CMD LOG` | Logout. |
| **Version Commands** | |
| `CMD V?` | Displays unit identification and software version number. |

The factory default login user name is `admin` and the default password is `admin`. The login name and password are case sensitive.

*If VT-100 local echo is enabled, the typed text appears on the local screen.*

The first time the system is powered on with the terminal connection plugged in, the factory default status message appears. Press the [Enter] key to display the login screen.

To log in to the SummitGbX, follow these steps:

1 Type **`CMD USR admin`**, followed by the [Enter] key.

The cursor blinks at the left edge of the screen, under the command just typed.

2 Type **`CMD PAS admin`**, followed by the [Enter] key.

The screen displays `login complete`.

### STATUS

Status messages are sent under several circumstances:

- When an error condition occurs.
- When an error condition clears.
- Approximately every 15 minutes.
- When requested by the user.
- When power is applied to the unit.

The format of the status message is identical in all cases. Figure 7 shows the format of a status response and Table 7 gives a description of each field. The columns identified by number hold variable data.

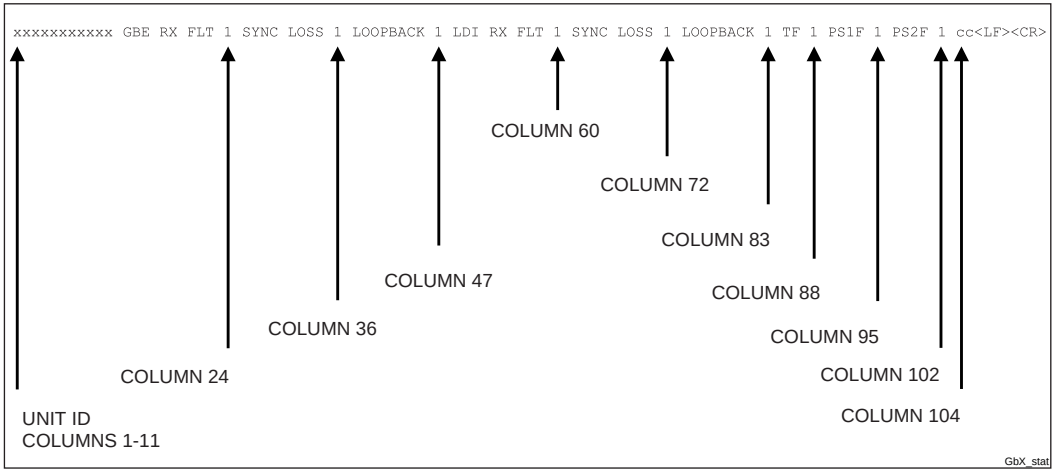


**Figure 7:** Status response

**Table 7:** Status Field Descriptions

| Column Location | Field Text | Description | Status Column |
|---|---|---|---|
| 1-11 | User Defined | SummitGbX ID | NA |
| 13-15 | GBE | Gigabit Ethernet Interface | NA |
| 17-24 | RX FLT | RX fault (low optical input power) | 24 |
| 26-36 | SYNC LOSS | Sync loss (clock recovery failure) | 36 |
| 38-47 | LOOPBACK | Loopback enabled | 47 |
| 49-51 | LDI | Long distance interface | NA |
| 53-60 | RX FLT | RX fault (low optical input power) | 60 |
| 62-72 | SYNC LOSS | Sync loss (clock recovery failure) | 72 |
| 74-83 | LOOPBACK | Loopback enabled | 83 |
| 85-88 | TF | Temperature fault, chassis | 88 |
| 90-95 | PS1F | Power supply 1 fault | 95 |
| 97-102 | PS2F | Power supply 2 fault | 102 |
| 104-xx | Variable | Comment field | NA |
| END | <LF><CR> | Message terminator | NA |

# TROUBLESHOOTING THE SUMMITGbX

This section describes troubleshooting procedures for the SummitGbX:

- Cleaning the optical connector
- Troubleshooting the link
- Loopback troubleshooting

## OPTICAL CONNECTOR CLEANING

*Connecting damaged or dirty optical fibers to the SummitGbX will damage the connectors and the internal optics.*

The following steps describe the procedure for cleaning an optical connector, shown in Figure 8.

1 Using filtered, compressed air, blow any dust out of the female connector mounted on the SummitGbx.

2 Wipe the tip and sheath of the optical fiber cable (located on the cable connector) with an optical swab that is moistened with optical grade isopropyl alcohol.

3 Wipe the tip and sheath of the optical fiber cable (located on the cable connector) with a dry optical swab.

4 Blow dry with filtered, compressed air.

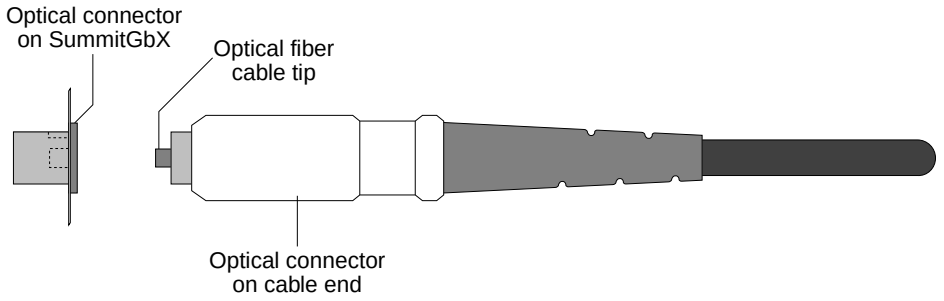


**Figure 8:** Optical connectors

Listed below are the suggested cleaning materials and sources:

- Compressed gas aerosol can, such as Chemtronics, Inc. (800-645-5244, www.chemtronics.com) product: 70 PSI
- Lint free swab, such as The Texwipe Company (Upper Saddle River, N.J. 07458) product: Micro Absorbond Swab TX759B
- Optical grade isopropyl alcohol

*Do not use rubbing alcohol. It contains 30% water.*

## LINK TROUBLESHOOTING

Follow these steps to help detect a link problem:

1 Clean the optical connectors, as described in the previous section.

2 Make sure that the connectors are plugged in correctly on both ends of the link.

3 Verify that the RX FLT LEDs (GBE and LDI) on the SummitGbX chassis are green on both ends of the link. An RX fault can be caused by incorrectly connected fibers (for example, TX-to-TX,) dirty or damaged connectors, or damaged fiber.

4 Using an optical power meter, select the appropriate wavelength (780, 1310, 1550 nm) and measure the input power at the ports. Power levels should be above the minimum specified in Table 3. Optical levels should operate about 3dBm greater than minimum levels to provide extra link margin.

5 Check the color of SYNC LOSS LEDs. If one of the SYNC LOSS LEDs is yellow, the Clock/Data Recovery (CDR) was unsuccessful in retiming the data at that input port. This can be caused by incorrect data rate (for example, 10/100 Mbps), poor signal quality (excessive jitter), or by a component failure.

6 Follow the loopback troubleshooting procedure, described in the next section.

*Never look directly into an optical connector, or through optical instruments or lenses, to detect presence of light.*

## LOOPBACK TROUBLESHOOTING

The purpose of the loopback troubleshooting procedure is to loopback data at various stages of the link, in order to isolate fault problems. Loopback can be performed electrically within the SummitGbX, and optically between SummitGbXs. Both methods are described in this procedure. By examining the hardware included or excluded with each step, the fault can be isolated to a single piece of equipment or fiber.

The following steps describe the loopback procedure for the SummitGbx, starting on the end of the link near you. The entire procedure can also be reversed, to start with the SummitGbX on the remote end of the link. Clean optical connectors before every connection.

Use one of these methods to verify the outcome of loopback troubleshooting steps:

- The terminal screen, if you are using a serial connection.
- The GUI, if you are using the GUI software.
- The front panel LEDs of the SummitGbX.

1 Using multimode fiber jumper(s), connect the Host's GBE TX and RX ports.

2 Reconnect the Host's GBE ports to the SummitGbX GBE port. Verify GBE LoopBack Enabled status. The GBE Loop Back LED should be yellow.

3 Using the management interface, disable GBE Loopback. Verify Loopback Disabled status. The GBE Loop Back LED should be green. Connect the SummitGbX LDI TX output to its LDI RX input using single mode fiber (an optical in-line attenuator is required for 80 km version only.) Verify optical power at RX.

4 Reconnect the SummitGbX LDI ports to the optical plant. Using the management interface of the remote SummitGbX, enable LDI Loopback. Verify Loopback Enabled status. The LDI Loop Back LED should be yellow.

5 Using the management interface of the remote SummitGbX, disable LDI Loopback. Verify Loopback Disabled status. The LDI Loop Back LED should be green. Connect the remote SummitGbX GBE TX output to the same SummitGbX RX input using multimode fiber.

6 Using multimode fiber jumper(s), connect the remote Host's GBE TX and RX ports.

*SummitGbX inputs and outputs are susceptible to damage through electro-static discharge (ESD). Always use ESD control measures when operating the unit.*

## TECHNICAL SPECIFICATIONS

The following tables list the technical specifications for the SummitGbX.

| | |
|---|---|
| **Physical Dimensions** | Height: 1.75 inches (4.45 cm) x Width: 19 inches (48.26 cm) x Depth: 15 inches (38.14 cm)<br>Weight: 7.5 lbs. (2.5 kg) |
| **Environmental Requirements** | |
| Operating temperature | 0° C to 50° C |
| Storage temperature | -10° C to 70° C |
| Operating humidity | 10% to 95% relative humidity, noncondensing |
| Standards | EN60068 (IEC68) |
| **Safety** | |
| Agency certifications | cUL listed to CSA C22.2 #950; 95 |
| **Electromagnetic Compatibility** | FCC part 15 Class A<br>CE Mark |
| **Power Supply** | |
| AC line frequency | 50/60Hz |
| Input voltage options | 100VAC to 240VAC auto-switching |
| Power rating | 50 watts |